Chapter 1

Literature Review

1.1 Introduction

This chapter details the previous work done in and around the area of Fire Engineering by other academics and research staff. This section identifies the research gap that this research is intended to fill.

Fire engineering covers a broad aspect of research, from investigation into costs, materials, construction methods and the psychology of occupants during fires. This chapter covers the research done in these areas, though mainly in regards to construction and costs of fires. It also includes a brief literature review on the construction of a software tool as this was the predicted outcome of this research.

1.2 Fire Protection

Society dictates that people should be able to enjoy a reasonable level of safety during day to day activites and as such, part of this is protection from natural and man made phenomena such as fire. Such demands for safety, espcially after large incidents where a considerable loss of life or property occurred, led to the initial development of the fire building regulations (Stollard and Johnston, 1994). These building regulations developed over time into the current form we have today in the UK (Communities and Local Government, 2006). These regulations are in place so that the building can be designed safely to allow occupants to escape should a fire occur and to prevent excessively quick fire spread, again, allowing for escape. This focus on life safety is the main concern behind the current regulations and appears to have been reasonably successful, as fire deaths have declined steadily over the past decade (Department for Communities and Local Government, 2010). However, there has been a steady increase in the cost of fires over the same period (Association of British Insurers, 2009). These figures seem to show that whilst the building regulations seem to be working for reducing and keeping the number of fire deaths low, their doesn't seem to be any reduction to the cost of fires by constructing to meet the building regulations.

Whilst Approved Document B lays down the building regulations in relation to fire safety and details the easiest method of meeting these regulations, it is by no means the only method of meeting the regulations. Designers also have aceess to two British Standards that set out methods of meeting the regulations. These British Standards are more advanced methods of designing buildings and therefore are used in the larger and more complex buildings. These two codes are also more open in how the design of the building can attain fire safety certification. BS 9999: Code of Practice for Fire Safety in the Design Management and Use of Buildings (BSI, 2008) is a relatively new code that attempts to make it easier for designers to incorporate fire safety into more complex structures without having to use PD 7974: Application of Fire Safety Engineering Principles to the Design of Buildings

(BSI, 2003) which is used in the most complex of buildings because it reduces fire safety to the first principles of fire science and requires an understanding of flame spread, fire dynamics and combustion science to use effectively.

To meet the fire regulations, buildings have to be protected by differenting fire protection systems. These systems delay the spread of fire and make it easier for the occupants to escape. The design of the building itself and the restriction in the use of combustible materials is one method of preventing fire spread is the main aspect behind the regulations. This method of preventing fire spread is refered to as passive fire protection, as the protection does not need to change state to complete it's function in preventing fire spread. However, additional systems are installed, such as fire alarms and extinction systems are installed and these are active fire protection measures. The combination of both active and passive measures provides the complete fire protection design for a building. Previous research has suggested that the includsion of active measures such as sprinklers can reduce the passive protection measures included in a building (Baldwin and Thomas, 1974)

1.3 Design Tools

1.4 Data Collection

1.5 Software Design

Bibliography

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